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Explanation of Significant Differences:

REILLY TAR & CHEMICAL CORP. (INDIANAPOLIS PLANT)
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EXPLANATION OF SIGNIFICANT DIFFERENCES

REILLY TAR & CHEMICAL SUPERFUND SITE
INDIANAPOLIS, INDIANA

I. Introduction

The Reilly Tar & Chemical Superfund Site (the Reilly site) is located at 1500 South Tibbs Avenue in the southwest quadrant of Indianapolis. Minnesota Street divides the 120 acre property into two parcels. The Oak Park property is located north of Minnesota Street and occupies approximately 40 acres. The Maywood property is located south of Minnesota Street and occupies approximately 80 acres.

The U.S. Environmental Protection Agency (U.S. EPA) and the Indiana Department of Environmental Management (IDEM) have jointly overseen cleanup activities at the Reilly site under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. Section 9601, et seq. U.S. EPA and IDEM entered into a Consent Decree with Reilly who agreed to perform the remedy for OU 2 at the site That Consent Decree was entered by the U.S. District Court for the Southern District of Indiana on February 6, 1995. The Consent Decree requires Reilly to implement the remedy selected by U.S. EPA (with IDEM's concurrence) in a September 30, 1993 Record of Decision (ROD). That Consent Decree and the accompanying documents will be modified, to the extent necessary, to reflect the remedy changes described in this Explanation of Significant Differences (ESD).

Reilly has designed and implemented the final remedy for OU 2 at the site under U.S. EPA and IDEM oversight. During the implementation process, newly discovered information has persuaded U.S. EPA and IDEM that certain technical modifications and improvements to the selected remedy are appropriate. Section 117(c) of CERCLA and Section 300 435(c)(2)(1) of the National Oil and Hazardous Substances Contingency Plan establish procedures for explaining, documenting, and informing the public of significant changes to the remedy that occur after the ROD is signed. An ESD is. required when the remedial action to be taken differs significantly from the remedy selected in the ROD but does not fundamentally alter that remedy with respect to scope, performance, or cost. This ESD and supporting documentation shall become part of the administrative record file which is available at the Indianapolis Public Library (48 East St Claire) and at the U.S EPA regional office in Chicago, Illinois (77 W. Jackson Blvd, 7th Floor), during normal business hours.

II. Summary of Site History, Contamination Problems, and Selected Remedy

A. Site History

Industrial development of the Reilly site began in 1921 when the Republic Creosoting Company (which later became Reilly Tar & Chemical, which in turn became Reilly Industries, Inc.) started a coal tar refinery and a creosote wood treatment operation on the Maywood property. On-site wood treatment operations occurred from 1921 until 1972. Beginning in 1941, several chemical plants were constructed and operated on the Oak Park property. Environmental problems at the site are related to the management and disposal of creosoting process wastes and to wastes associated with and substances used in the process of manufacturing custom synthesized specialty chemicals.

In 1984, Reilly Tar was listed on U.S. EPA's National Priorities List (NPL), a roster of the nation's worst hazardous waste sites, making it eligible for cleanup under the Superfund program In 1987, the potentially responsible party (Reilly) agreed to conduct a remedial investigation (RI) to characterize the nature and extent of contamination at the site, and a feasibility study (FS) to evaluate and compare remedial alternatives according to the terms of an Administrative Order on Consent between the U.S. EPA and Reilly Tar & Chemical.

In 1989, Reilly Tar & Chemical changed their corporate name to Reilly Industries, Incorporated, under which they operate today.

In June, 1992, a Record of Decision was signed by the Regional Administrator for the first operable unit at the site, calling for a groundwater extraction/treatment/discharge system to be installed to contain the migration of groundwater contaminated by the site at the site boundary.

In September, 1992, Reilly agreed to incorporate RCRA corrective action requirements into existing site studies according to the terms of an amendment to the existing Administrative Order on Consent between the U.S. EPA and Reilly Tar & Chemical.

B. Contamination Problems

A detailed analysis of past operations during Task 2 of the Remedial Investigation demonstrated that there are at least five former waste disposal areas onsite. These five former waste disposal areas were identified as potential source areas for both on-site and off-site contamination. These include the Lime Pond on the Oak Park property, the Abandoned Railway Trench on the northern portion of the Maywood property, the Former Sludge Treatment Pit on the northern portion of the Maywood property, the Drainage Ditch on the southern portion of the Maywood property and the South Landfill on the southern portion of the Maywood property (See Figure 1). This task also identified groundwater as a primary area of investigation for the RI.

The Lime Pond was a lagoon constructed in 1953 to receive waste discharges from the first synthetic pyridine base processing unit constructed on the Oak Park property. Dimensions of the Lime Pond are approximately 350 feet by 350 feet. Until 1965, discharges from process areas on the Oak Park property went to the Lime Pond, which included solid material and sludge that had settled out of the waste water discharged to the Lime Pond area. Since 1965, when a connection to the city sewer was made, the Lime Pond has received only water from boiler blowdown from the boiler operations on the Oak Park property.

Buried drums were discovered during the RI soil borings at the Lime Pond. These drums were encountered at locations to the east and southeast of the lime pond during soil boring activities. A magnetometry survey was immediately conducted which highlighted several areas to the north and east of the lime pond where buried metallic debris such as drums may be located. A

drum removal plan was prepared and its requirements were incorporated into the amended administrative order on consent signed in September, 1992. This plan called for the investigation of the areas identified by the magnetometer survey and if drums were unearthed, they were to be removed. A total of 149 drums were removed during field activities in November 1992. The area from where the drums were excavated is referred to as the Lime Pond Drum Removal area and is one of the areas addressed by the September 1993 ROD.

Borings in the Lime Pond generally encountered lime sludge from the pond surface to a depth of four to seven feet. The Lime Pond contains on the order of 15,000 cubic yards of lime sludge generated from boiler blowdown (water used for cooling of boilers that does not come into contact with production of chemicals). This lime sludge generally contains less than one part per million total organics.

The soils to the north and east of the Lime Pond, in the Drum Removal Area, were found to be contaminated with volatile organics up to levels of approximately 5,522,000 parts per billion (ppb) and semi-volatile organics up to levels of approximately 9,870,000 ppb.

The Abandoned Railway Trench was used as an unloading and loading area for incoming rail shipments. The railroad tracks were constructed below ground level to facilitate these operations. During the 1960s, the use of the railway trench for loading and unloading purposes decreased and it was gradually filled in with drums of off-specification coal tar enamel. Foundry sand obtained from a variety of local industry was also used to complete the filling of the trench. It is estimated that the trench was approximately five feet deep by fifteen feet wide by 580 feet long based on Phase II investigations.

Test pits completed in the railway trench area revealed a sloping rail bed at a depth of approximately three feet at the south end of the trench and at a depth of approximately at the north end. A surface layer of crushed stone was encountered at each test pit location and fill material consisting of black, brown or gray sand and gravel, foundry sand, coal cinders, coal tar wastes, wood debris and drums was found beneath. Soil contaminant concentrations trench sampling for volatile organics ranged to 656,000 ppb and for semi-volatile organics 126,020,000 ppb.

From the early 1950s until 1979, waste water sludge from the coal tar refinery and synthetic chemicals operations was dried by placing it in the Former Sludge Treatment Pit, located in the center of the Maywood property. The sludge pit was used for thickening sludge by evaporation prior to off-site landfill disposal. The current RCRA-permitted sludge treatment area is located directly above the northern portion of this historical area. The dimensions of the original sludge pit, as reported in the RI, are 110 feet long by 20 feet wide by 4 feet deep

Soil contaminant concentrations in the sludge pit sampling for volatile organics ranged to 202,900 ppb and for semi-volatiles 53,710,000 ppb.

From the beginning of site operations in 1921 until the mid 1970s, the southern portion of the Maywood property was used as a landfill, the South Landfill, for construction debris and soil. In addition, various solid and semi-solid wastes (tars, sludges, still bottoms, tank cleanings) from the coal tar and the synthetic chemicals operations were also deposited in this area. Coal refinery wastes deposited in the area included off-specification pitches, creosoted timbers, coal, and tank car sludges and waste water sludge from the Maywood American Petroleum Institute (API) separator. Wastes from the synthetic chemical operations were also deposited in the south landfill beginning in the 1960s. These wastes included waste water sludge from the API separator and distillation residues from various unit processes including vinylpyridine residue and 3-pyridine carbonitrile residue. Dimensions of the south landfill are approximately 1000 feet by 200 feet.

A dug well, or fire pond, was situated at the extreme southeast corner of the south landfill. This pond was reportedly dug by facility personnel for the purpose of providing a water supply for fire suppression. The dimensions of the fire pond were approximately 112 feet in diameter and 23 feet in depth. The fire pond dried up after a period of time, probably due to the increased industrial groundwater usage in the site vicinity. Limited data regarding the materials used to fill the dry dug well (reported to be tars, sludges, various chemical production residues, and foundry sand) were derived during the RI.

The estimated volume of fill material in the South Landfill is 34,000 cubic yards. Soil contaminant concentrations in the South Landfill sampling for volatile organics range to 197,300 ppb and for semi-volatiles 35,280,000 ppb. Field investigations in this area also identified both NAPLs (non-aqueous phase liquids) and DNAPLs (dense non-aqueous phase liquids) as present in the groundwater in the form of oily sheen and distinct oil phases in groundwater samples.

A RCRA facility investigation in 1990 identified potential releases of hazardous constituents from surface water drainage from the South Landfill. An inspection by the Department of Fish and Wildlife on January 31, 1992 identified the fire pond sludges as imminently hazardous to wildlife As a result, EPA directed Reilly to perform an interim measure at the South Landfill to minimize these risks until a final remedial action could be implemented. This interim measure consisted of regrading and covering the eastern portion of the landfill with six inches of clean soil, placement of plastic netting over the fire pond to prevent waterfowl from landing in this area, and construction of drainage controls to prevent runoff from this area from leaving the site .These activities were completed in April 1992.

Prior to 1970, waste water and storm water were conveyed from the API separator by the Former Drainage Ditch into the Raymond Street storm sewer, which then discharged directly to Eagle Creek. This water consisted of water separated from the raw tar, water decanted from the tar storage tanks, water separated from the oil-water, "wet-dry" in the refinery, blowdown water from the boiler operations, aqueous sodium sulfate from the extraction of tar acids and tar bases from the light and middle oils, and storm water entering the system due to natural drainage. Historically, the length of the ditch was 1220 feet, the width was between 15 and 50 feet, and the depth was approximately 8 feet.

Soil contaminant concentrations in the Former Drainage Ditch sampling for volatile organics range to 199,930 ppb and for semi-volatiles 117,120,000 ppb.

Hot Spot Delineation

Further evaluation of the RI data by U.S. EPA determined that the soil contamination was present in discrete locations within the CERCLA Areas. These hot spots, if addressed, would significantly reduce the contaminant concentrations at the site as well as significantly reduce the risks posed by contributions to soil and groundwater contamination from these areas. All of the CERCLA Areas were reevaluated by U.S. EPA to develop hot spot volumes for treatment alternatives for soil cleanup; this reevaluation process yielded revised volumes for three of the areas, the Lime Pond Drum Removal Area, the Abandoned Railway Trench, and the Former Drainage Ditch, that were significantly lower than those presented in the Feasibility Study/Corrective Measures Study (FS/CMS), that represent the majority of the contamination associated with the CERCLA Areas.

The revised volumes represent the most heavily contaminated soils in the unit, which is a portion of all the soil in the unit. CERCLA Areas were evaluated by examining the results of the soil/sludge testing and the Toxicity Characteristic Leachate Procedure (TCLP) testing. The samples collected during the Remedial Investigation/RCRA Facility Investigation (RI/RFI)

activities were evaluated to determine if the contaminant concentration for pyridines or carcinogenic PAHs exceedled the risk-based target cleanup levels (RBTCLs) presented in the FS, and if the TCLP results exceeded discharge criteria (Maximum Contaminant Levels (MCLs)) for drinking water for benzene, pyridine and carcinogenic polynuclear aromatic hydrocarbons(CPAHs).

The visual characteristics of the samples were compared and areas that appeared to contain the majority of contamination were identified for removal and treatment. The volume of soil be removed was calculated and an estimate of the mass of contaminants to be treated was made. An estimate of the mass of contaminants to remain was also made. By comparing the two, the percentage of the total contaminant mass to be treated was estimated. The following summarizes this process for the three CERCLA Areas.

Abandoned Railway Trench: According to the FS/CMS, the railway trench is approximately 640 feet long by 17 feet wide. The railway trench is bordered by a wooden retaining wall on the north and on the east and by a concrete building foundation on the south. The FS/CMS extended the width of soil requiring remediation beyond the limits of the trench 5 feet to the east and to the west to include additional impacted soils. The depth requiring remediation was estimated to be 20 feet for the northern 490 feet (representing the depth to groundwater) and 4 feet for the remainder of the railway trench (representing the depth to just below the railbed). The volume of material requiring treatment was estimated in the FS/CMS to be 10,320 cubic yards

The gross contamination is present in the original width of the railway trench (17 feet) to a depth of approximately 5 feet (to the bottom of the railbed). The gross contamination appears to end within test pit J-05 where the description of the soil above the railbed changes from dark brown-grey sand and clay to brown sand and gravel, trace cobbles, medium coarse sand. No samples were taken south of this transition point. The length of gross contamination considered in the revised volumes was 512 feet (compared to 640 feet estimated in the FS/CMS), because the contamination was not as laterally extensive to the south as originally estimated, using the criteria for identification of hot spots, as outlined below.

The results of the evaluation showed that a reduction in the amount of soil to be treated could be made, while keeping a high percentage of reduction in the amount of contamination removed. The FS/CMS identified 10,320 cubic yards of soil to be treated. The EPA evaluation determined an 82% reduction in that amount. A revised amount of 1850 cubic yards of soil needed treatment. The percentage removal of contaminants found in the revised soil amount is as follows: 100% of the detected benzene; 99.9% of the detected pyridines; and 73.9% of the detected CPAHs.

The volume of soil to be treated encompasses 12 of the 15 samples where concentrations exceeded the industrial RBTCL (presented in the FS/CMS) and all four of the samples where the Toxicity Characteristics Leaching Procedure (TCLP) data showed exceedances of discharge criteria. This volume does not include soils outside of the wooden retaining wall, because they are part of the kickback area which is to be addressed in future actions, as is stated in the FS/CMS.

Former Drainage Ditch: The Former Drainage Ditch contains two apparently separate areas of contamination - a layer of cinders/tar/oily gravel that varies from about 1 to 1.5 feet thick, and an oily material that occurs within the original drainage ditches .The FS/CMS did not include remediation of the cinder/tar/oily gravel layer in the volume calculations. This layer is attributed to the kickback area in the FS/CMS. The volume estimated in the FS/CMS that requires remediation includes an area 35 foot wide by 4 feet thick along 660 feet of the west drainage channel and 50 feet along the east drainage channel. (3700 cubic yards). The total volume of contamination in the area of the drainage ditch, as presented in the FS/CMS, is approximately 5800 cubic yards.

The gross contamination (besides the cinders/tar/oily gravel layer) does appear to be centered on the west drainage channel. The width of the contaminated soil (visually identified as black clayey silt, black silty clay, black silt (oily), and black tar) varies from 5 to 12 feet wide according to the test pits. The revised volume of soil to be excavated and treated includes the material centered on the west drainage channel and the cinders/tar/oily gravel layer that covers the area.

The results of the evaluation showed that a reduction in the amount of soil to be treated could be made, while keeping a high percentage of reduction in the amount of contamination removed. The FS/CMS identified 5800 cubic yards of soil to be treated. The EPA evaluation determined an 66% reduction in that amount, which resulted in a revised amount of 1950 cubic yards to be treated. The percentage removal of contaminants found in the revised soil amount is as follows: 96.5% of the detected benzene; 99.6% of the detected pyridines; and 94.7% of the detected CPAHs.

The volume of soil to be treated encompasses 7 of the 8 samples where concentrations exceeded the industrial RBTCL and both samples where the TCLP data showed exceedances of discharge criteria.

Lime Pond Drum Removal Area: Waste materials were deposited north and east of the Lime Pond in what is referred to in the FS/CMS as the drum removal area. The wastes were originally assumed to have been deposited in trenches, two running north-south east of the lime pond and one running east-west north of the lime pond. The volume of waste associated with these trenches was estimated based on the results of a geophysical investigation.

The drums were located and removed as part of the Lime Pond drum removal project. Samples of the waste material around the drums were collected during the drum removal. The FS/CMS estimated the volume of waste material based on an "L" shaped area to the north and east of the lime pond. The depth of contaminated material was estimated to be 15 feet. Based on these assumptions, the volume of material requiring remediation was estimated in the FS/CMS to be 29,000 cubic yards.

In the revised volume calculations, it was assumed that the gross contamination is limited to the trenches. Analytical data is unavailable in the areas outside the drum removal excavation areas. While it is possible that gross contamination may exist outside of the trench areas, the volume of gross contamination is not anticipated to be significant. This assumption is based on the RI geophysical evaluation. The depth of gross contamination was estimated to be 10 feet. The test pits excavated during the Lime Pond drum removal project extended to depths from 4 to 12 feet below ground surface. Drums were encountered as deep as 6 feet below ground surface.

The revised volume of gross contamination is about 5400 cubic yards, approximately 19% of the volume calculated in the FS/CMS. No samples were collected and tested outside of the excavation areas, therefore no comparison of mass contamination to remain versus mass contamination to be treated can be performed. Some contamination may remain through the leaching of the waste material.

Former Sludge Treatment Pit: The Former Sludge Treatment Pit was reevaluated using the criteria mentioned above for determination of hot spot volumes. The volume presented in the FS/CMS (800 cubic yards) was found to be accurate for hot spot delineation at this area. South Landfill/Fire Pond: The South Landfill/Fire Pond was reevaluated using the criteria mentioned above for determination of hot spot volumes. Due to the widespread contamination at this area, the absence of any discernable hot spot area, and the prohibitive volume of contaminated soils at this area, it was determined that the South Landfill/Fire Pond would not be included in the hot spot delineation. One area that was identified as a hot spot was the Fire Pond, which is the

subject of remediation as a portion of the September 1993 ROD.

The cost and volume estimates presented in the FS for the alternatives analysis are for hot spot soils in the source areas which address the most contaminated portions of these areas. The term "hot spot soils" is defined as including, but not limited to, those soils which exhibit visible evidence of contamination, or which fail the TCLP test.

The FS estimated volumes of contaminated soil for each of the source areas. Further evaluation of the RI data showed that the soil contamination was concentrated in discrete locations within the source areas. These hot spots were found to be the greatest contributors to groundwater contamination. Over 90% of the soil contamination is present in these hot spot areas which comprise approximately 20% of the total volume presented in the FS. As a result, treating the hot spot soils, which constitute a small portion of the source areas, was also considered by EPA Treatment alternatives presented in the September 1993 ROD represent cleanup of those hot spot areas.

C. Selected Remedy

The ROD for OU 2 (September 1993) required:

- Excavation and thermal treatment of 8,100 tons of contaminated soils at four on-site areas.

- Disposal of treatment condensate by off-site incineration.

- Treatment of sludge in a fifth on-site area by in-situ solidification.

- Placement of a soil cover over the solidified sludge.

- Long-term groundwater and source area monitoring for all five CERCLA Areas.

III. Description of the Significant Differences and the Basis for those Differences:

The Remedial Action at the South Landfill was completed in April 1996. This action included the solidification of approximately 12,882 tons of sludge in the south landfill and the placement of a soil cover over the solidified area.

During thermal treatment operations at the site, it was determined that the majority of the soils to be treated by thermal desorption contained extremely high BTU levels. The thermal desorption system cannot process soils with a BTU level above 800 BTU/lb. This 800 BTU/lb level is utilized throughout the thermal desorption industry as a standard for determining eligibility and applicability of the technology. Soils which contain organic material in excess of 800 BTU/lb become additional fuel for the thermal desorption system which results in temperature increases inside the primary kiln to levels beyond the capabilities of the thermal desorption equipment. This leads to the destruction of the refractory linings, fires within the baghouse, and essentially, the incineration of the soils instead of the desorption of the contaminants from the soils.

In the sampling performed by the PRP contractor, it was determined that the high BTU level in the soils is not a reflection of the contaminant concentration, but a reflection of the content of total organic material (contamination and naturally occurring organics) within the soil. The PRP contractor tried to "blend" the soils in order to lower the overall BTU level. However, when this blended material was treated, an exothermic reaction occurred in the primary

kiln causing an uncontrollable increase in temperature which resulted in the shut down of the system to protect the associated hardware and personnel at the site. The feed soils were immediately sampled for BTU levels and found to contain BTU "hot spots" exceeding 1000 BTU/lb. These results demonstrate that the high BTU material cannot be blended thoroughly enough to eliminate small BTU "hot spots" in the soil that cause the exothermic reactions. Therefore, because this excavated soil could not be treated using the selected remedial method of thermal desorption, the selected remedy must be changed to address this remaining contaminated soil.

A series of off-site disposal options were evaluated and submitted to U.S. EPA for consideration. These off-site disposal options included both treatment options and options for off-site disposal at a compliant landfill. Because the selected remedy employed treatment to address the highly contaminated soils removed from the hot spot areas, and the remedial intent of the ROD was to remove the contaminants present in the soils, U.S. EPA and IDEM favor the treatment options presented for the remaining soils.

Original Remedy	Modified Remedy
Excavation and on-site thermal desorption of 8,100 tons of contaminated soil	Excavation and on-site thermal desorption of 3,600 tons of contaminated soil.
Off-site disposal of treatment residuals by incineration	Excavation of 4,000 additional tons of contaminated soil to be addressed by this action.
	Off-site thermal treatment of approximately 8,500 tons of contaminated soil in an industrial boiler or a cement kiln

Through this ESD, EPA is allowing for off-site treatment of the contaminated soils as opposed to the on-site treatment required in the original ROD. Through a combination of these two treatment options, the soil will be treated off-site to meet the performance standards contained in the operational permits for each respective facility.

It is estimated that approximately $1,250,000 in cost savings can be realized when using the off-site treatment soil treatment options instead of on-site thermal treatment.

IV. Support Agency Comments

IDEM concurs with this ESD.

V. Affirmation of the Statutory Determinations

Considering the new information that has been developed and the changes that have been made to the selected remedy, U.S. EPA and IDEM believe that the remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the September 1993 ROD as applicable or relevant and appropriate to this remedial action at the time of the original ROD, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

VI. Public Participation Activities

U.S. EPA will publish a notice of this ESD in the Indianapolis Star, informing interested parties that a copy of the ESD and supporting documentation is available at the Indianapolis Public Library, 48 East St. Clair, Indianapolis, Indiana, and at the U.S. EPA regional offices in Chicago, Illinois, 77 W. Jackson-7th Floor, during normal business hours.

VII. Concurrence

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